Hollow Shaft Type 5-phase Stepper Motor $(\square 42 \, \text{mm}, \square 60 \, \text{mm}, \square 85 \, \text{mm})$

AHK Series

INSTRUCTION MANUAL

TCD210123AB

Autonics

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- A symbol indicates caution due to special circumstances in which hazards may occur.

★ Warning Failure to follow instructions may result in serious injury or death.

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime / disaster prevention devices, etc.)
- Failure to follow this instruction may result in personal injury, economic loss or fire.

 10. Do not use the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present. ction may result in explosion or fire
- 03. Fix the unit on the metal plate.
- Failure to follow this instruction may result in personal injury or product and ambient equinment damage
- 04. Do not connect, repair, or inspect the unit while connected to a power source. e to follow this instruction may result in fire
- 05. Install the unit after considering counter plan against power failure.
- illure to follow this instruction may result in personal injury, economic loss or fire
- 06. Check 'Connections' before wiring.
- 07. Do not disassemble or modify the unit.
- e to follow this instruction may result in fire or electric shock.
- 08. Install the motor in the housing or ground it. ailure to follow this instruction may result in personal injury, fire or electronic shock
- 09. Make sure to install covers on motor rotating components.
- 10. Do not touch the unit during or after operation for a while.
- ilure to follow this instruction may result in burn due to high temperature of the surface.
- 11. Upon occurrence of an error, disconnect the power source.
- Failure to follow this instruction may result in personal injury, fire or electronic shock.

▲ Caution Failure to follow instructions may result in injury or product damage.

- 01. Use the unit within the rated specifications.
- ailure to follow this instruction may result in fire or product damage
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent.
- 03. The motor may overheat depending on the environment
- Install the unit at the well-ventilated environment and forced cooling with a cooling fan. this instruction may result in product damage or deg
- 04. Keep the product away from metal chip, dust, and wire residue which flow into the unit. illure to follow this instruction may result in fire or product damage

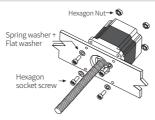
Cautions during Use

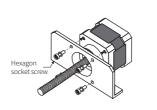
- · Follow instructions in 'Cautions during Use'.
- Otherwise, it may cause unexpected accidents
- · At low temperature, reducing the grease's consistency of ball-baring and etc. causes the friction torque increment.
- Start the motor gradually since motor's torque is in normal state.
- Maintain and inspect regularly the following lists.
- Unwinding bolts and connection parts for the unit installation and load connection Abnormal sound from Ball-bearing of the unit
- Damage and stress of lead cable of the unit
- Connection error with driver
- Inconsistency between the axis of motor output and the center, concentric (eccentric.) declination) of the load, etc.
- This unit may be used in the following environments.
- Indoors (in the environment condition rated in 'Specifications')
- Altitude max. 2,000 m
- Pollution degree 2 - Installation category II

Cautions during Installation

- Follow instructions in 'Safety Considerations' and 'Cautions during Use'
- Otherwise, it may cause unexpected accidents.
- Install the motor in a place that meets the certain conditions specified below. It may cause product damage if it is used out of following conditions.
- Inside of the housing which is installed indoors (This unit is designed/manufactured for the purpose of attaching to equipment.
- Install a ventilation device.)
- The place without contact with water, oil, or other liquid
- The place without contact with strong alkali or acidity
- The place with less electronic noise occurs by welding machine, motor, etc.
- The place where no radioactive substances and magnetic fields exist. It shall be no vacuum
- Motor can be installed horizontally and vertically. Refer to 'Shaft Allowable Load along Installation
- If a force (30 N) exceeding the specification is applied to the motor cable during installation, it may cause the contact failure and disconnection
- If the excessive force or frequent cable movement is required, establish safety measures
- In consideration of heat dissipation and vibration prevention, mount the motor as tight as possible against a metal panel with high thermal conductivity such as iron or alum

Installation Method





Frame size	Mounting plate thickness	Applied bolt
☐ 42 mm	≥4 mm	M3
□ 60 mm	≥5 mm	M4
□ 85 mm	≥8 mm	M6

Cautions during Shaft Assembly

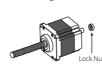
- Make sure that the external shaft assembly into the motors must be made sturdy.
- If the shaft is not installed firmly, the motor torque may not be throughly transmitted to the external shaft
- In case no additional shaft assembly changes would be made, it is recommended to apply
- adhesives on bolt fixing part.

 Use pliers to fasten lock nut tightly.

■ Tap hole

■ Single shaft through hole





through hole

Dual shaft

Lock Nut provided

Hexagon socket screw.

flat washer, spring washer, lock washer provided

Lock Nut provided

Ordering Information

This is only for reference, the actual product does not support all combinations.. For selecting the specified model, follow the Autonics website

8 4 5 6 A **0 2** K -

Motor shape

H: Hollow shaft type

2 Max. stop torque

Number: Max. stop torque (unit: kgf cm)

Rated current S: 0.75 A / Phase

Axial length

6 Frame size

4: 42 mm 6: ☐ 60 mm

9: 🗌 85 mm

Number: Refer to 'Dimensions' M: 1.4 A / Phase **7** Shaft type G: 2.8 A / Phase No mark: single shaft

W: dual shaft

4 Motor phase 5: 5-phase

Wiring method No mark: Pentagon S: Standard (option)

Product Components

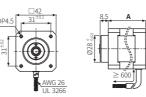
Product

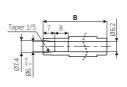
Instruction manua

Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
- · The external shaft must be processed as shown below.
- The corresponding motor follows direct connection instead of using coupling.
- Depending on shaft processing, hollow shaft can be used both single and dual. Gray line in shaft process is only available in dual shaft type.

■ 42 mm

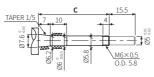


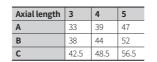


Hole dimensions

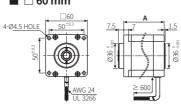
Hole dimensions

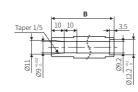
Shaft Process



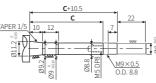






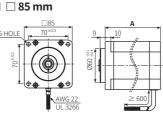


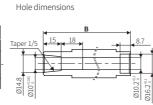
Shaft Process



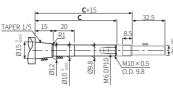
Axial length	4	6	9
Α	47	58	87.5
В	49.3	60.3	89.8
С	46	57	86.5

■ □ 85 mm





Shaft Process



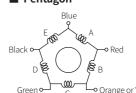
xial length	6	9	13
	68.4	97.9	128.4
	73	102.5	133
	64.5	94	124.5

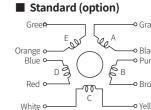
Specifications

Model	AH1K-S543-□	AH2K-S544-□	AH3K-S545-□		
Max. stop torque	1.3 kgf cm (0.13 N m)	1.8 kgf cm (0.18 N m)	2.4 kgf cm (0.24 N m)		
Rotor inertia moment	35×10 ⁻⁷ kg ⋅ m ²	54×10 ⁻⁷ kg · m ²	68×10 ⁻⁷ kg ⋅ m ²		
Rated current	0.75 A / Phase				
Basic step angle	0.72° / 0.36° (Full / Half step)				
Unit weight (packaged)	\approx 0.25 kg (\approx 0.35 kg)	$\approx 0.30 \text{ kg} (\approx 0.40 \text{ kg})$	\approx 0.40 kg (\approx 0.50 kg)		
Model	AH4K-□564□-□	AH8K-□566□-□	AH16K-□569□-□		
Max. stop torque	4.2 kgf cm (0.42 N m)	8.3 kgf cm (0.83 N m)	16.6 kgf cm (1.66 N m)		
Rotor inertia moment	175×10 ⁻⁷ kg · m ²	280×10 ⁻⁷ kg · m ²	560×10 ⁻⁷ kg · m ²		
Rated current	S: 0.75 A / Phase M: 1.4 A / Phase				
Basic step angle	0.72° / 0.36° (Full / Half step)				
Unit weight (packaged)	\approx 0.60 kg (\approx 0.87 kg)	$\approx 0.80 \mathrm{kg} (\approx 1.07 \mathrm{kg})$	$\approx 1.30 \text{ kg} (\approx 1.57 \text{ kg})$		
			L		
Model	AH21K-□596□-□	AH41K-□599□-□	AH63K-□5913□-□		
Max. stop torque	21 kgf cm (2.1 N m)	41 kgf cm (4.1 N m)	63 kgf cm (6.3 N m)		
Rotor inertia moment	, 8	2,700×10 ⁻⁷ kg · m ²	4,000×10 ⁻⁷ kg · m ²		
Rated current	M: 1.4 A / Phase G: 2.8 A / Phase				
Basic step angle	0.72° / 0.36° (Full / Half step)				
Unit weight (packaged)	\approx 1.70 kg (\approx 2.18 kg) \approx 2.80 kg (\approx 3.28 kg) \approx 3.80 kg (\approx 4.28		\approx 3.80 kg (\approx 4.28 kg)		
Matauahaaa	Г -h				
Motor phase	5-phase				
Insulation class	B type (130°C)				
Insulation resistance	Between the charging part and the case: ≥ 100 MΩ (500 VDC == megge				
Dielectric strength 01)	Between the charging part and the case: 1,000 VAC $\sim 50/60$ Hz for 1 minute				
Temperature rise	≤ 80°C (5-phase excitation for rated current, while stop)				
Ambient temp.	-10 to 50°C, storage: -25 to 85°C (no freezing or condensation)				
A colored to the contract	35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)				
Ambient humi.	00 to 00 /0/11/1, 5to 146c. c		IP30 (IEC34-5 standard)		
Protection rating					

Connection Diagram

Pentagon





• In case of connecting standard wiring to 5-phase stepping motor driver, make sure that the motor's lead wire connection must be made as table blew.

	Pentagon	Standard (option
Color	Blue	Gray + Red
	Red	Yellow + Black
vire	Orange	Orange + White
ead wire	Green	Brown + Green
ě	Black	Blue + Purnle

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